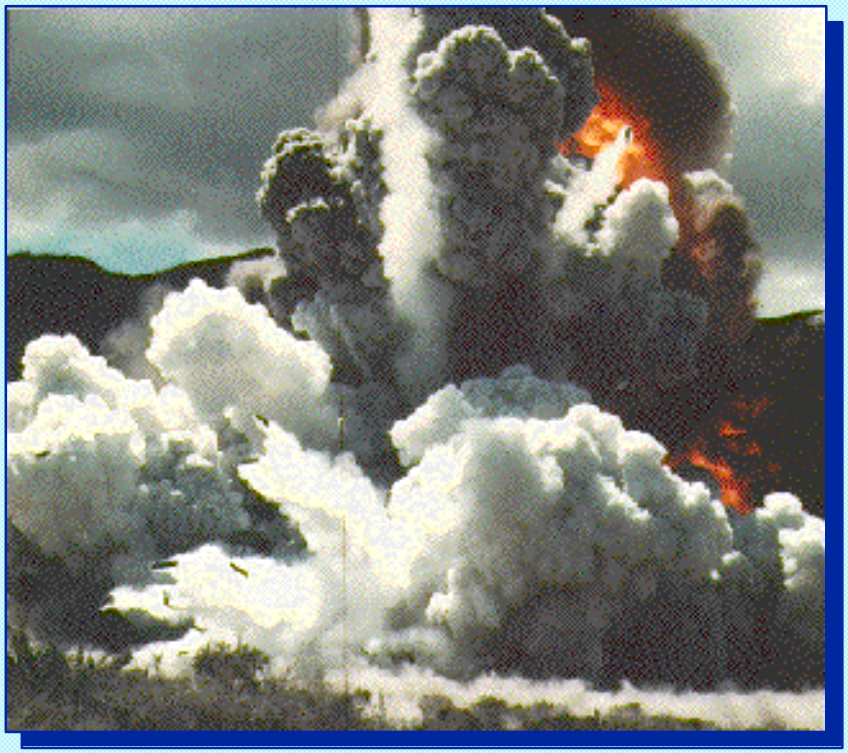
SHORE FACILITIES DEPARTMENT



MAKING AN IMPACT WORLDWIDE

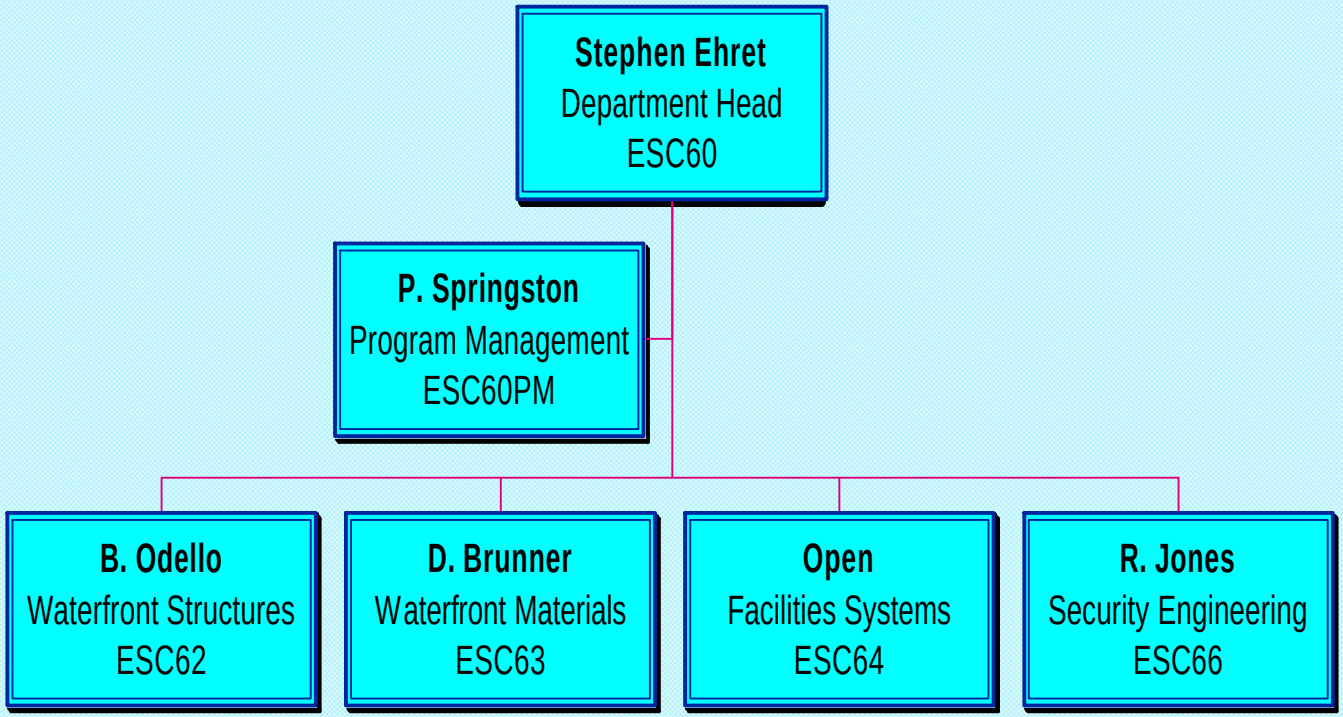
February 2000

Preston Springston
Shore Facilities Program Manager
(805) 982-1225, springstonps@nfesc.navy.mil

Mission

Provide Technology and Specialized Engineering Services to Plan, Design, Construct, Maintain and Operate an Effective Shore Establishment to Support Operational Readiness, Affordability and Life Safety

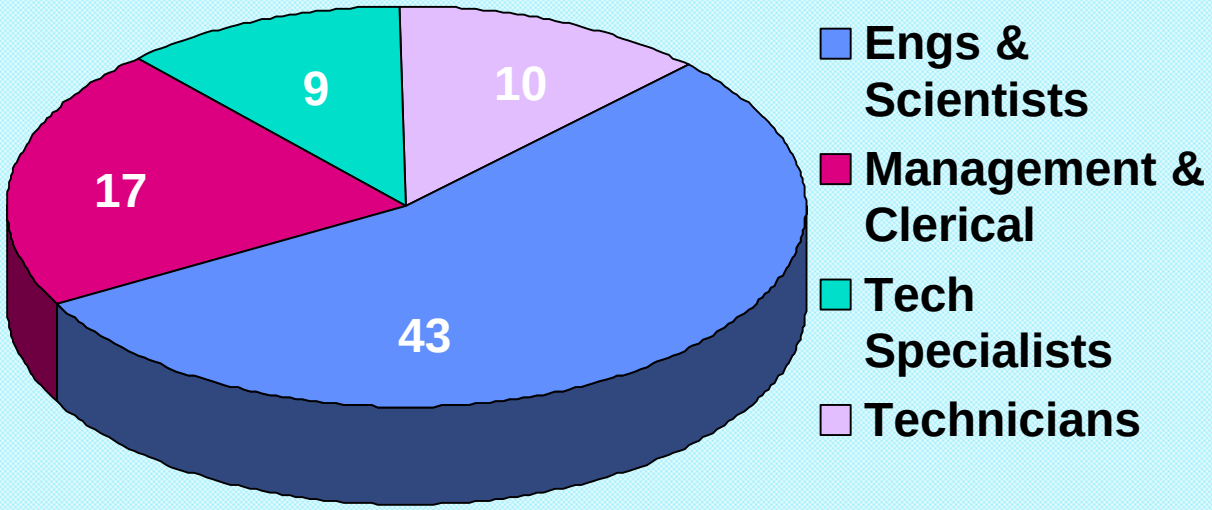
Organization



DOD Leadership

- **Waterfront Technology**
- **Locks, Safes, Vaults & Containers**

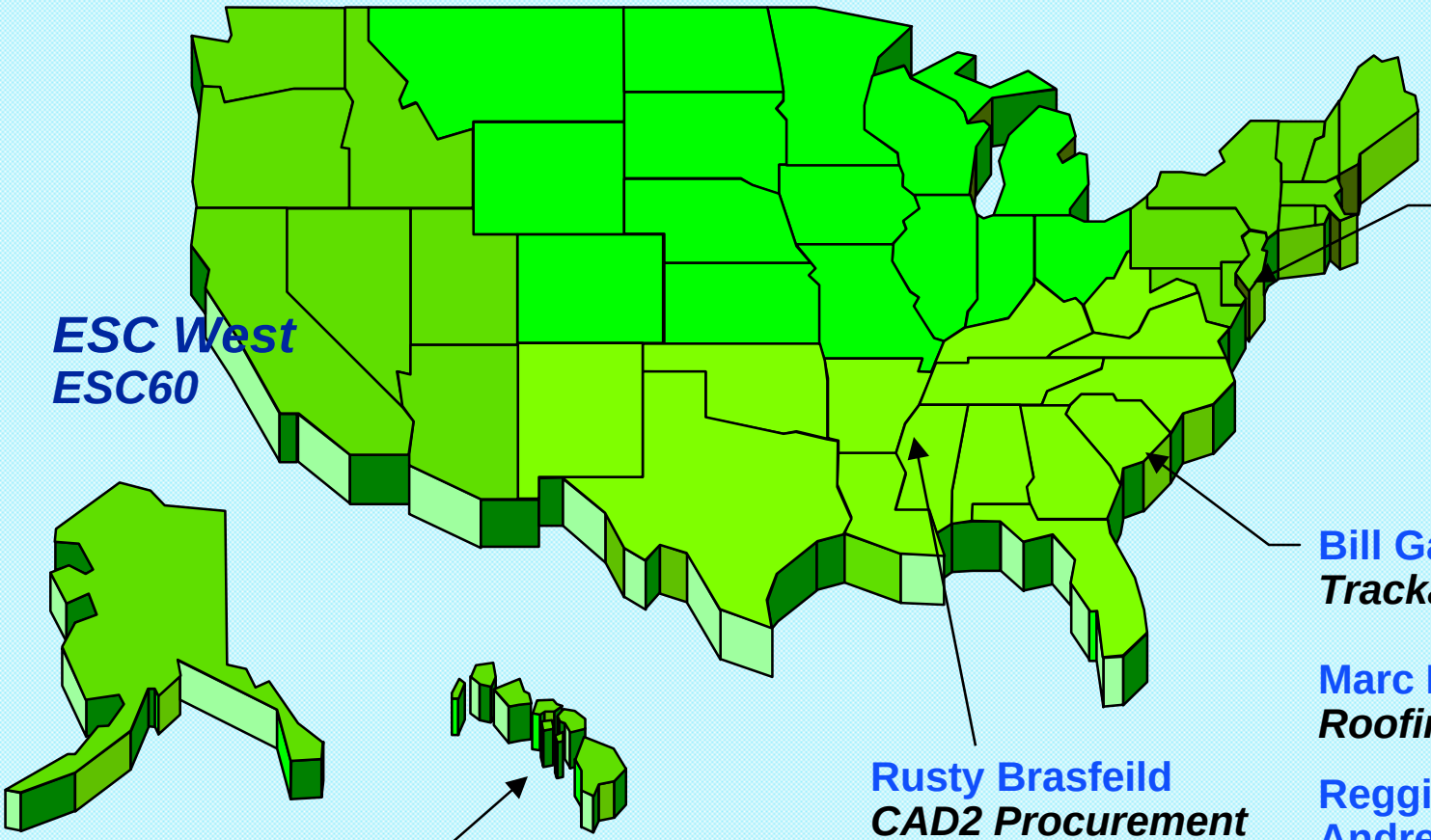
Staffing



Total Full Time Personnel: 79

Feb. 99

Offices



ESC West
ESC60

C. Schiavino
Pavements

Bill Ganon
Trackage

Marc DeOgburn
Roofing

Rusty Brasfeild
CAD2 Procurement

Reggie Turknett & Ed Andrews
AETFs

Tom Tehada
Cathodic Protection

Navy-wide Expertise
Public Works

- **Specialized Expertise**
  - **Cathodic Protection** *(PACDIV)*
  - **Coatings**
  - **Pavements** *(EFANORTH)*
  - **Roofing** *(SOUTHDIV)*
  - **Trackage** *(SOUTHDIV)*
  - **Waterfront Facilities Maintenance**
  - **Direct Digital Controls**
  - **Thermal Plants** *(EFA Great Lakes)*
  - **Vertical Transportation**

Shore Facilities Department

Navy-wide Expertise
Planning & Design

- **Technical Centers of Expertise**
  - **Aviation Engine Test Facilities** *(SOUTHDIV)*
  - **Security Engineering**
  - **Explosives Safety / Ordnance Facilities**
  - **Drydocks & Marine Railways**
  - **Communication Towers/Antennas**
  - **Fleet Moorings**
  - **Hyperbaric/Diving Facilities**
  - **Hyperbaric Certification**
  - **Offshore Structures**
  - **SCADA Systems**
  - **Underwater Cable Facilities**
  - **Uninterruptable Power Systems** *(LANTDIV)*

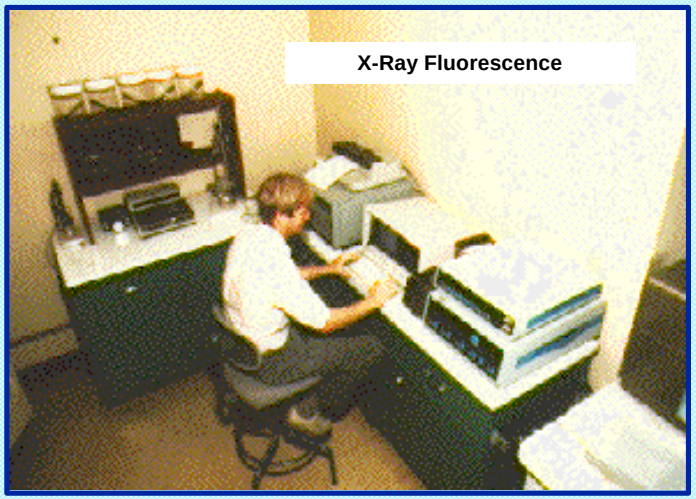
} **Shore Facilities Department**

Specialized Testing Equipment

Materials

- Infrared Spectroscopy
- Atomic Absorption Spectroscopy
- Ultraviolet/Visible Spectroscopy
- X-Ray Florescence
- Gas & Liquid Chromatography
- Thermal Analysis
- Optical & Electron Microscopy

Static Test of Concrete Fender Pile



X-Ray Fluorescence

Structures

- to 300 kip
- 50 kip Programmable
- Fatigue testing
- Shaker Exciter (250 lb mass)

Advanced Waterfront Technology Test Site

- 1/2 Scale
- Embedded Instrumentation
- Static & Dynamic Load Tests
- Durability & Constructability Evaluation

Current Projects

- **USA CERL**
  - All Composite Bridge Deck
  - Pre/Post-Tensioned Carbon Concrete Piling & Bridge Deck
- **Office of Naval Research**
  - Pier Structural Upgrade Systems
  - Waterfront Repair Materials
  - Lateral Stability NDE

Product Lines

Waterfront Facilities

Aviation Facilities

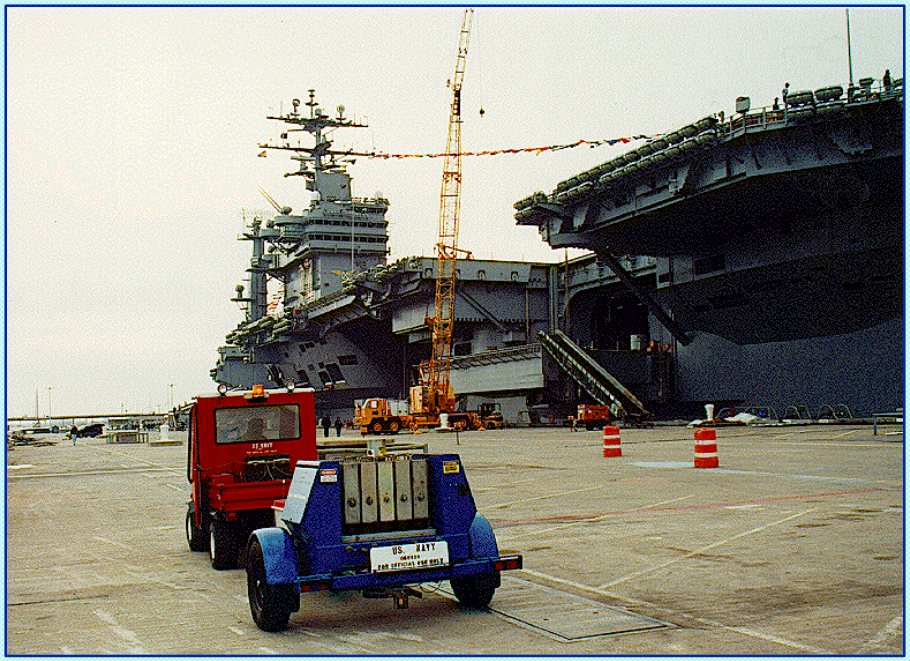
Ordnance Facilities

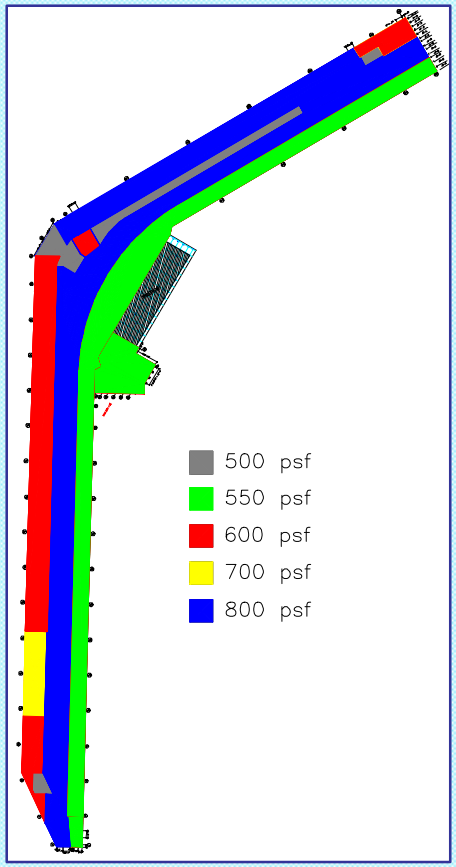
Physical Security

Installation Life Cycle Management

Waterfront Facilities

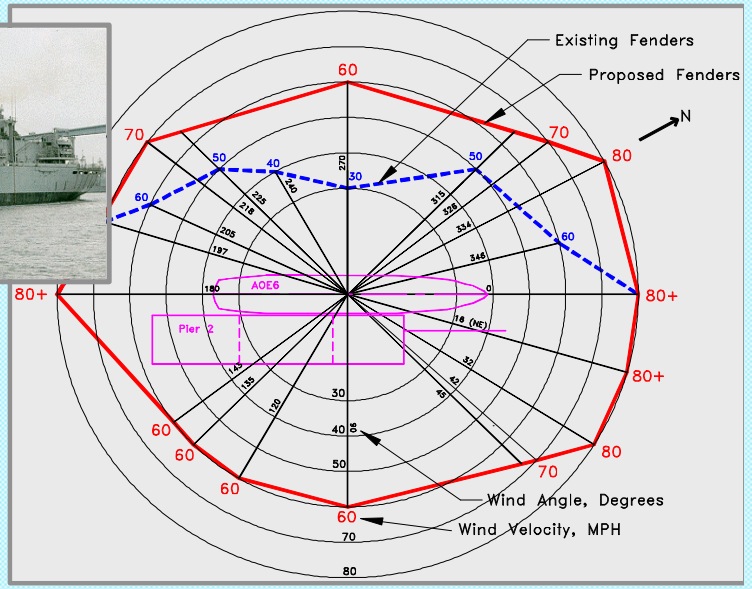
- **Load Safety Assessment**
- **Repair & Strengthening Systems**
- **Materials Engineering**
- **Seismic Engineering**
- **Structural Analysis**
- **Component Testing**





Pier Load Safety Assessment

- **NWS Earle Pier 2- Analyzed Capacity to Moor USS Supply**
- **FY99 Tasking - Assess Pier 4 Safety for Operation of 300T Crane**



- **TRIREFFAC Bangor Marginal Wharf - Specified Safe Loads for 5 Types of Mobile Cranes**
- **Mapped Safe Uniform Loads**

Pier Repair & Strengthening Systems

Corrosion Arrestment and Composite Strengthening Systems

- **40% Strength Increase**
- **$1-2M vice $40M**
- **20 Year Life Extension**

- **NAVSTA San Diego Pier 12**
  No Crane Load to 40T Crane
- **Pearl Harbor Wharf B25**
  30T to 50T Crane
  490 psf to 900 psf
- **Bangor Marginal Wharf**
  Current Project

Advanced Fendering Systems

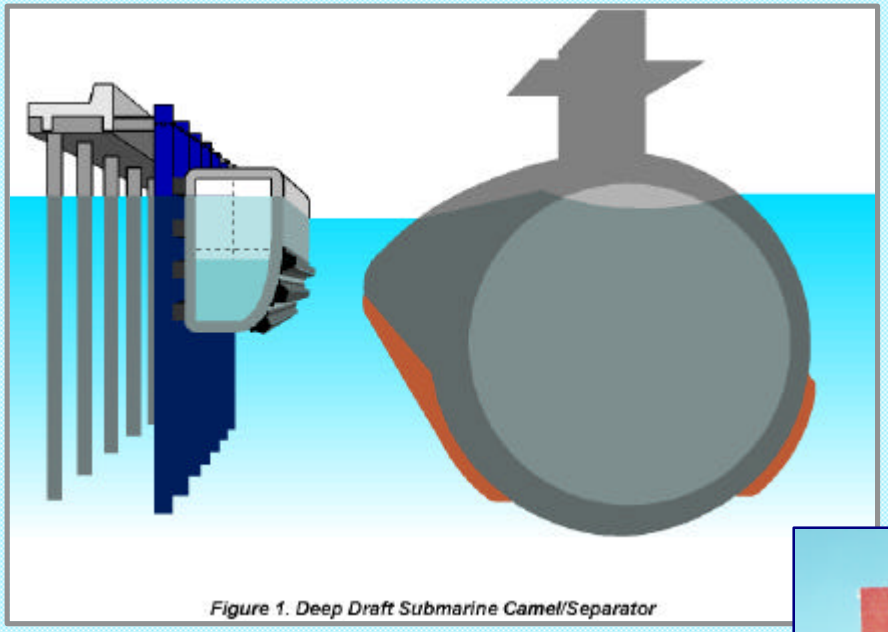


Figure 1. Deep Draft Submarine Camel/Separator

T&E of Plastic & Composite Fender Systems for Berthing Major Combatants

- **Composite Piles & Universal Sub Camel**
- **Engineered Wood Chocks & Wales**

- **Benefits**
  > $20M Savings in 10 Years
  Environmentally Benign
  No Ship Damage
- **Recent Projects**
  SUBASEs San Diego & New London

NAVSTA Bremerton Pier D

Review of Preliminary Design, Specifications & Basis of Design for MCON P-341

- EFANW Project
- A/E - Moffatt & Nichol Inc.

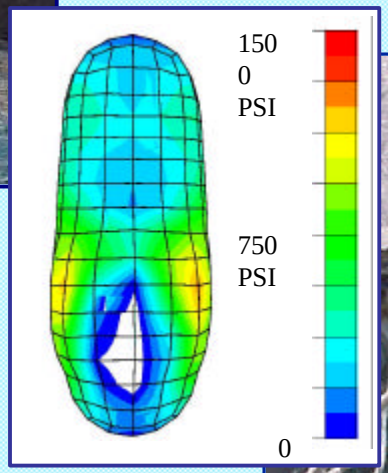
- Materials
- Seismic Engineering
- Mooring & Fendering
- Structure

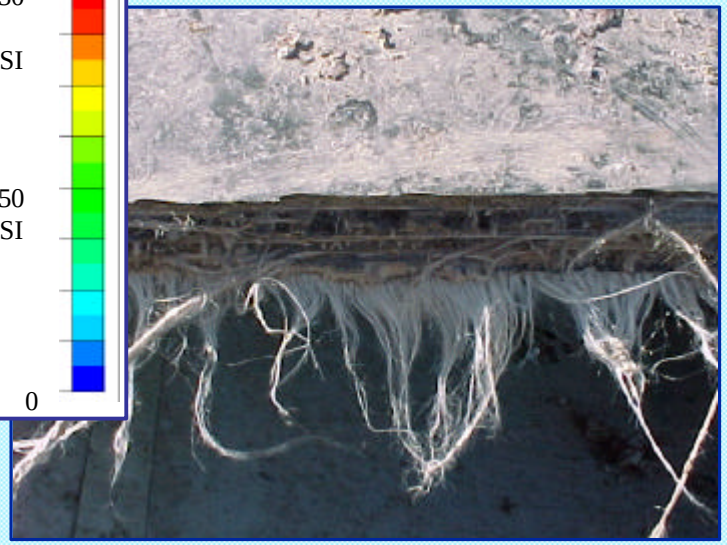
Design / Build Contract

Hydro-Pneumatic Fender Failure Investigation

Investigated catastrophic failure of Seaward Inc. camel at SUBASE San Diego

SSR-2478-SHR





- **Manufacturing Defects**
- **Recommended**
  Design Improvements
  Counter Weight Reduction
  Increase in Internal Pressure

Waterfront Materials Engineering

Cathodic protection, fusion-bonded epoxy coated rebar, rebar corrosion inhibitors, concrete crack sealers, marine concrete mixes, improved shotcrete, coatings technologies applied to,

- **Lower Initial Costs**
- **Longer Service Life**
- **>$26M in Savings**

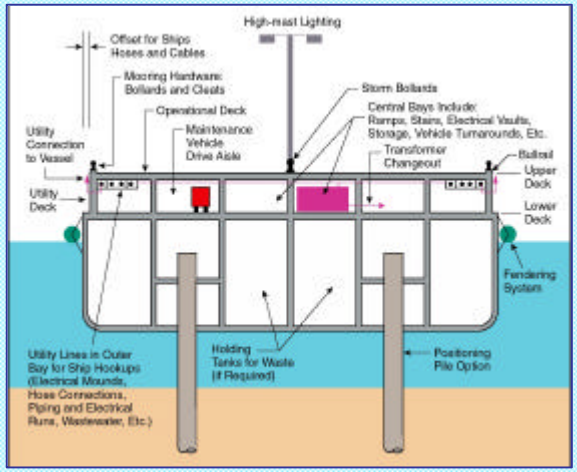
- **PACDIV**
  - ADM Clarey Bridge
  - Wharf B25
- **PWD Puget Sound NSY**
  - Drydocks #6 & #7
- **SWDIV**
  - North Island P-700/700A
- **SBAFT**
  - NAVSTA San Diego Pier 12

Modular Hybrid Waterfront Structures

Developing Modular Pier of Prefabricated Composite Reinforced Lightweight Concrete

- **ONR Sponsored**
- **FY02/03 MCON Linked**
  - **San Diego P327**

- **Compared to Conventional Pile-Supported Structure**
  - **Marginal Initial Cost Increase**
  - **Twice Service Life**
  - **80% Less Maintenance & Repair Cost**
- **Mission Flexibility**
  - **Reconfigurable & Relocatable**



Real Property Maintenance DEMVAL

http://www.nfesc.navy.mil/costreduc.htm

T&E of High Performance Materials & Construction Systems to Reduce Cost of Real Property Maintenance

- •Moisture-Cured Urethane
- •Roofing Management Sys.
- •Hangar Floor Coatings
- •High Temp Airfield Pavement
- •FRP Appurtenances
- •HVFA Concrete

- **Reduced Maintenance**
- **30% to 300% Longer Service Life**
- **Seeking Activity Partners**

Industry Consortia

NAVAL FACILITIES ENGINEERING SERVICE CENTER

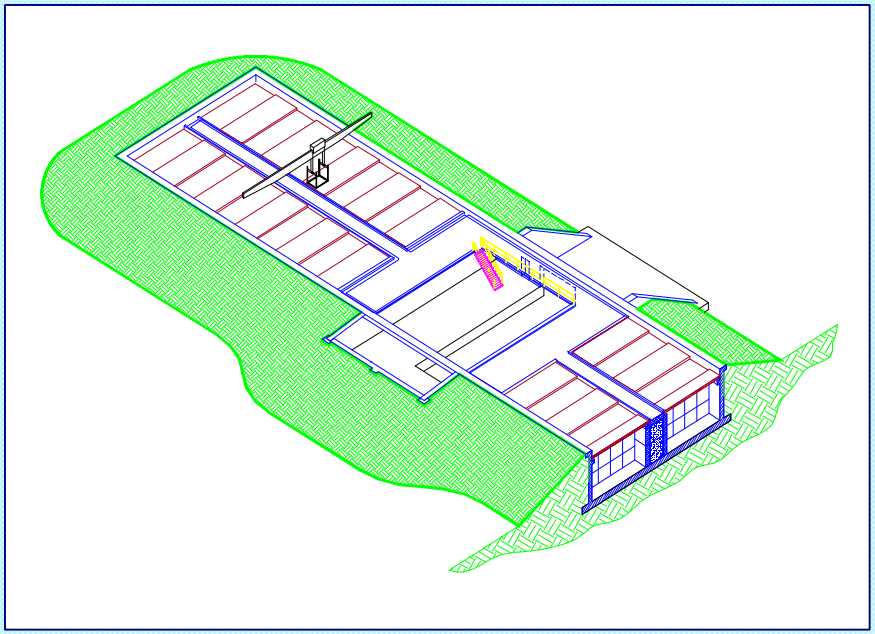
Explosives Safety

- Facility Basis of Design
- MCON Design Review
- Explosion Effects Prediction
- Structural Response Prediction
- Mitigation Techniques

High Performance Magazine Storage Cell Test

High Performance Magazine

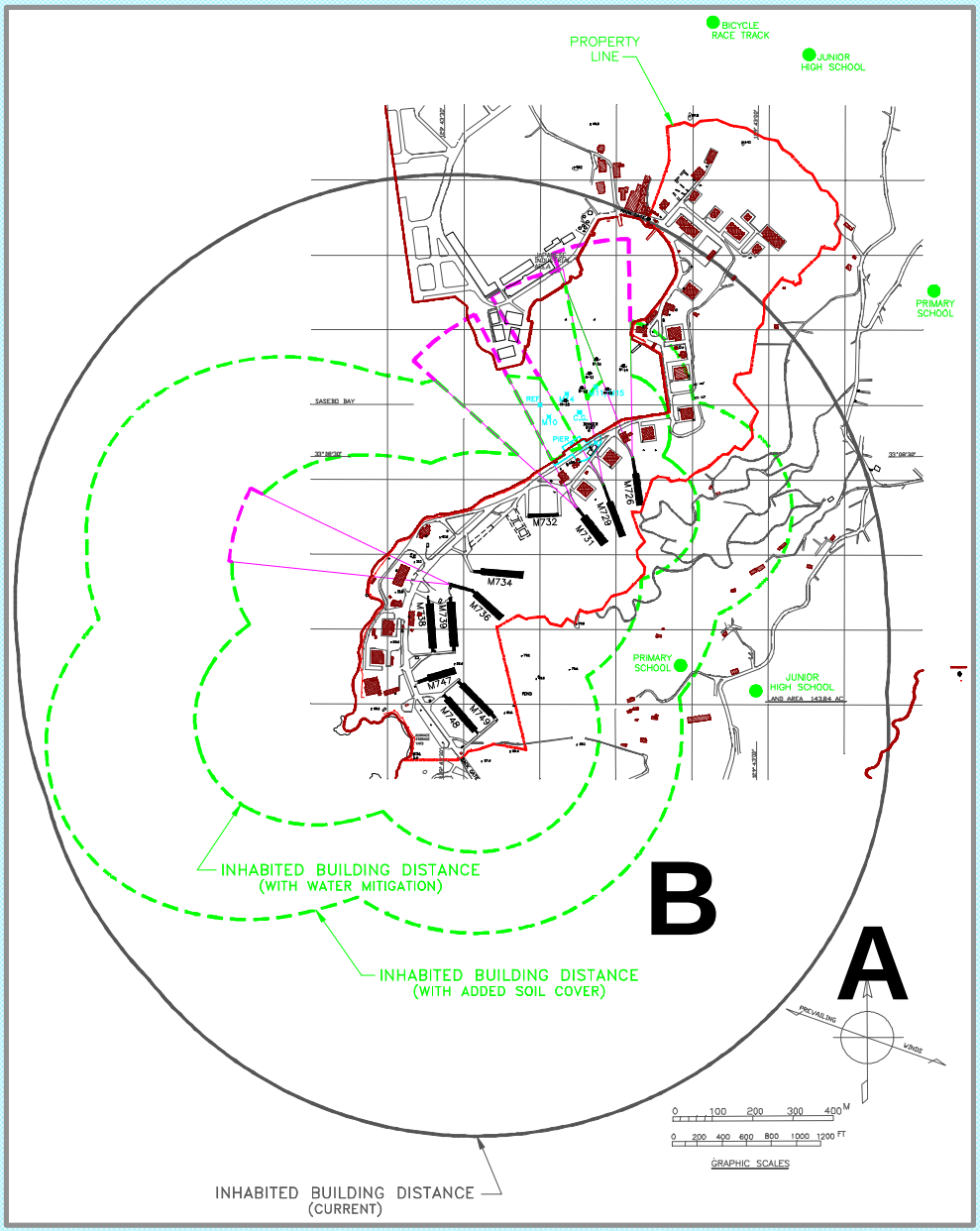
Sample Benefits



- **MCAS Iwakuni**
  - More Capacity
    220 st (Current); 480st (Future)
  - 7 Fewer Magazines
  - Increased Operations Flexibility
- **NWS Yorktown, B-1816**
  - Use Non-Propagation Walls
  - Maintain 30,000 lb Capacity
  - Avoid Reconstruction
    >>$100K vice $5M
- **Fleet Activity Sasebo**
  - Reduced Land Fill
    Potential Savings >$82M
- **NAVSTA Norfolk**
  - Loss of Sub Tender, FY99
    Avoid Transport to Yorktown
    $425K to $850K /YR RSSI Savings
- **MCB Hawaii**
  - Non-Propagation Walls
  - Enabled Magazine Siting at CALA
  - Increased Operations Efficiency
  - Reduced Operations Cost

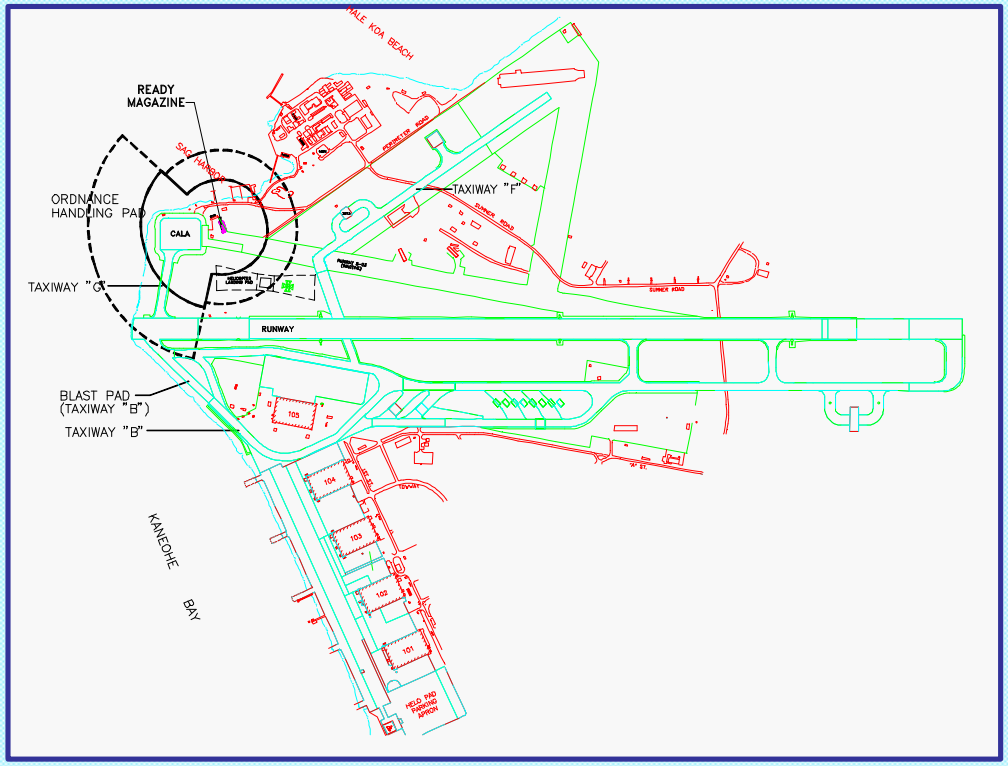
FLEACT Sasebo Tunnel Magazines

Engineering study reduced ESQD arcs of tunnel magazines at Maebata



- **Recommended Ordnance Loading & Earth Cover Reduced Arc from A to B**
  - **Unencumbered much of Sasebo**

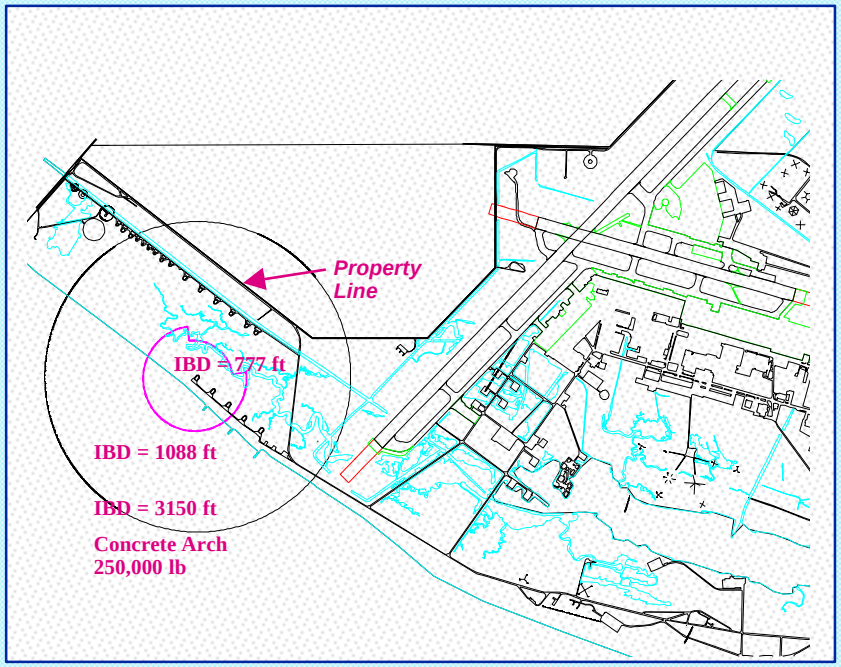
Modular Ready Magazine
MCB Hawaii



Design & Siting Approval for Modular Ready Magazine at CALA

- **Application of HP Magazine Technology**
  - **Non-Propagation Walls**
    - **>> 5 Compartments (500 LB NEW ea.)**
- **Reduced ESQD Arc (1250 ft to 750 ft)**
- **Supports P-3 Aircraft Ops**

Installation Life Cycle Management



- Inter-Department Networks
- Data Base integration
- Automated Mapping
- Training

- Data Base Management Systems
- Geographic Information Systems

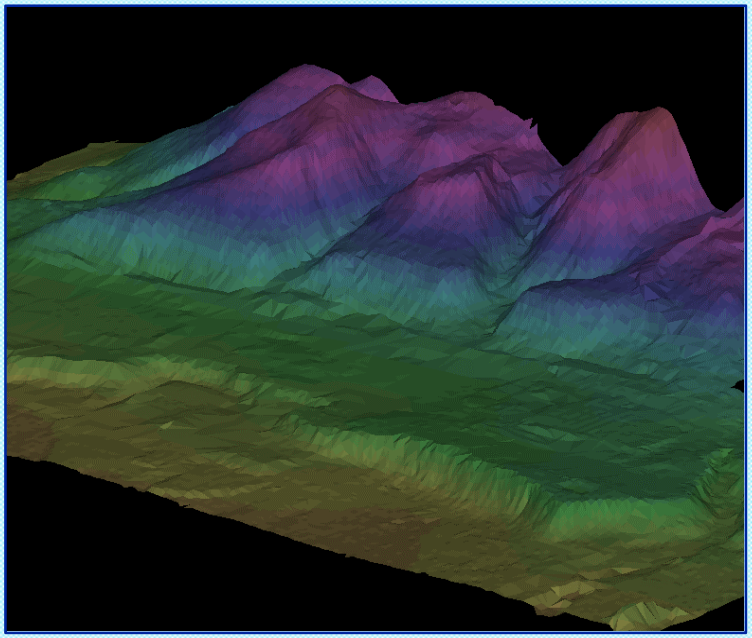
Geographic Information Systems

ArcView-based, NFADB-linked Geographic Information Systems. Turnkey Service - WAN/LANs, Aerial Orthophotos / Mapping, Data Base Population and Integration, Training

- **Better Management**
  - **Facilities & Natural Resources**
- **Better Planning**
  - **Pollution Prevention**
  - **Contingencies**

- **Recent Systems**
  - **MCB Hawaii**
  - **MCAS Yuma**
  - **NAS Agana Guam**

Camp Pendleton GIS

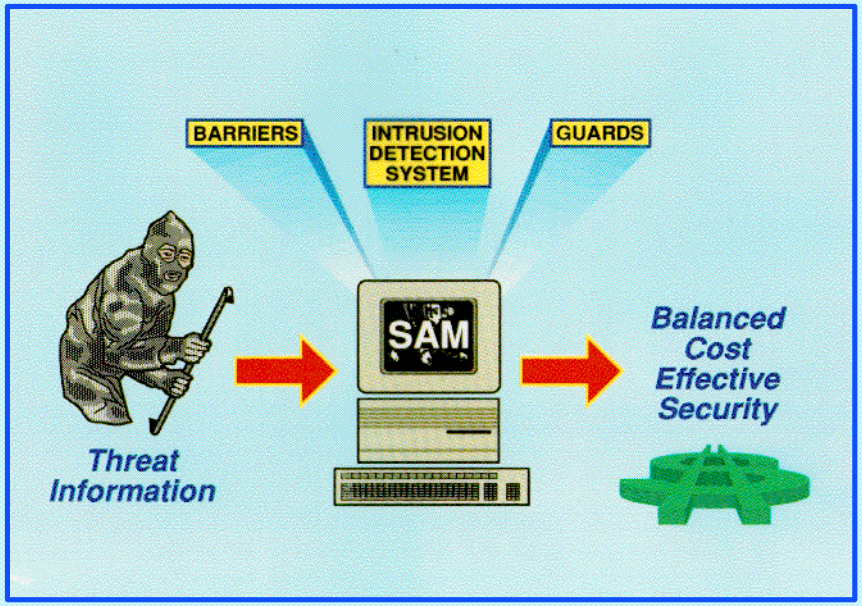


WAN/LANs, Aerial Orthophotos / Mapping, Data Base Integration & Facilities Management Systems Linking All Functional Areas

- **Better Communication**
- **Decrease RPM Costs**
- **Increase Productivity**
- **Avoid Redundant Repairs**

- **Similar Systems**
  - **MCAS Yuma (underway) , MCAS Iwakuni (planned)**
- **Modules in Progress**
  - **Provost Marshals Office, Range Scheduling & Env. Sec.**

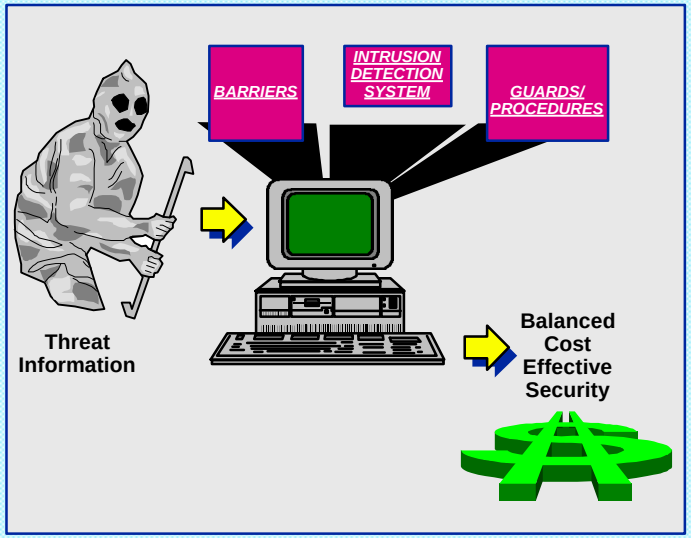
Security Engineering



- Automated Site Assessment
- Facility Design
- System Engineering
- Procurement Assistance

Tri-Service Lead for Locks, Safes & Barriers

Security Risk Management



On-Site Worldwide Consulting to Obtain Acceptable Levels of Security through Vulnerability Assessments & Systems Integration

- Threat Assessment, Asset Risk & Prioritization
- Cost-Effective Counter-Measures

- Reduced Vulnerability of U. S. Assets
  - Tarina Albania, Sarajevo Bosnia, Nicosia Cypress, & Abidjan Cote De Ivoire
- $2-6M Savings at ASU Bahrain
  - Operational & Procedural Changes
  - Fewer Troops & Patrol Guards
- $3-4M Annual Savings at NAVSSES Philadelphia
  - Reduced Guards from 50 to 27

DOD Lock Program

Supports Engineering, Procurement, T&E, Training, Installation, & Publications of Locking Devices and Security Containers

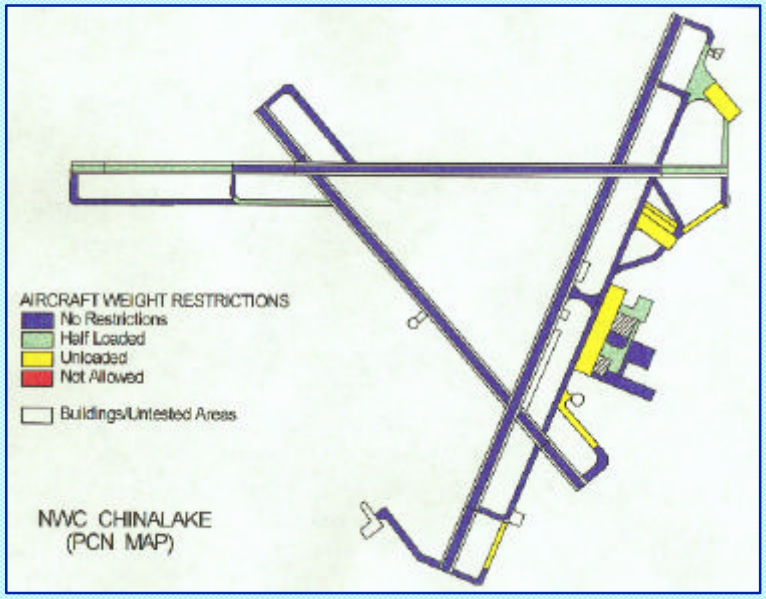
- **All DoD**
- **More Sophistication Required by an Adversary**
  - **Nullifies Traditional Entry Techniques**
  - **Meets Mission & Operational Req.**

- **Security Technology Program Saves $5M / Year**
- **Drawer Head Replacement Saves $3M / Year**
  - **Lock Out Procedure Opening & Repair Time Reduced 60%**
  - **Security Container Custodian Lost Time Reduced 50%**
  - **Drawer Head Replacement Cost Reduced $300 ea.**

Aviation Facilities

- **Pavements, Sealants & Marking Systems**
  - **Specs**
  - **Testing**
  - **Evaluation**
- **Pavement Condition Evaluation**
- **AETF QC & Evaluation**
- **Training**

Airfield Pavement Management



- **EFDs Collect Data**
  - Pavement Condition Index
  - Pavement Classification Number
- **ESC Develops Graphics Tools**
  - Maintenance, Repair & Construction
  - Airfield Operations Planning

- **ESC Prioritizes All Navy & USMC Pavement Projects**
  - $250M Value of C3 Rated Projects
- **Avoids Pavement Damage, Needless Restrictions & Unnecessary Repairs**
- **Cost Avoidance**
  - NAS Pt. Mugu ($22M); NAS Fallon ($2.5M); MCB HI ($4.1M)

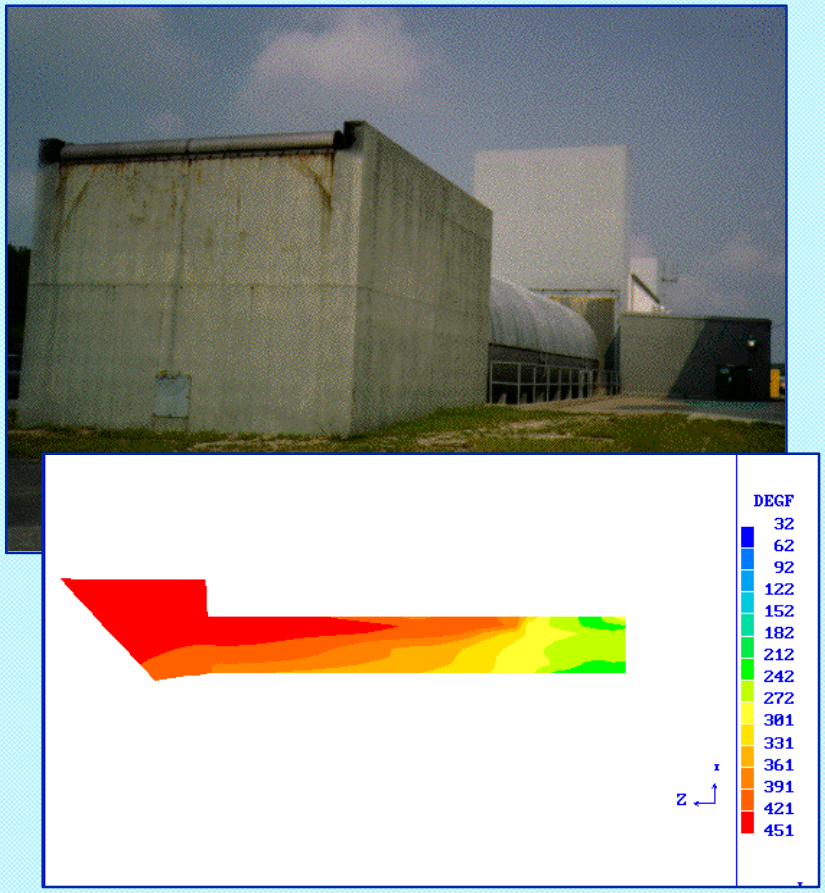
Airfield Pavement Void Detection

Problem: Several recent incidents of Navy aircraft punching through airfield pavements jeopardizing pilot safety

NAS Pensacola

- Detected Voids using FWD
- Recommended Load Capacities, Restrictions and Repairs
- Developed Interim Guidelines
- Initiated Technology Evaluation

Aviation Engine Test Facilities



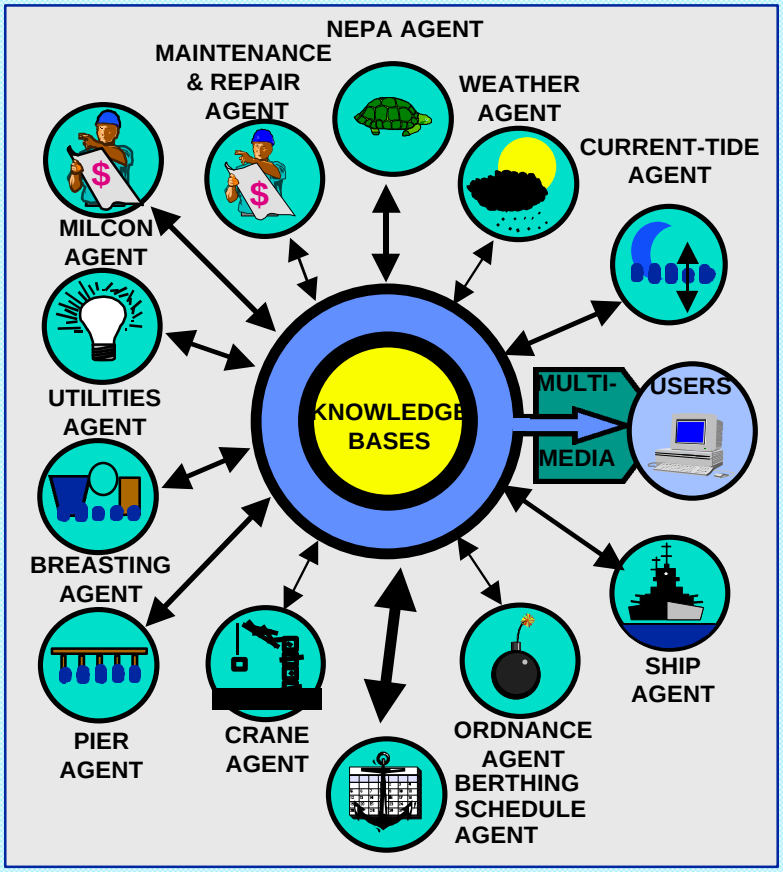
- **Aerothermal Performance Prediction**
  - Simulation & Modeling
  - Testing
- **Materials**
  - Investigation
  - Specs
- **Construction**
  - QC

NAVFAC Technical Center of Expertise

Summary

- **Specialized Services**
  - **Highly Competent Engineers & Scientists**
    - **>> NAVFAC Technical Experts (COE)**
    - **>> DoD Leadership**
- **Unique Testing Facilities & Equipment**
- **Application of Advanced Technology**
- **Client Focused**
  - **Easy Access, Responsive, Affordable**

BACKUP



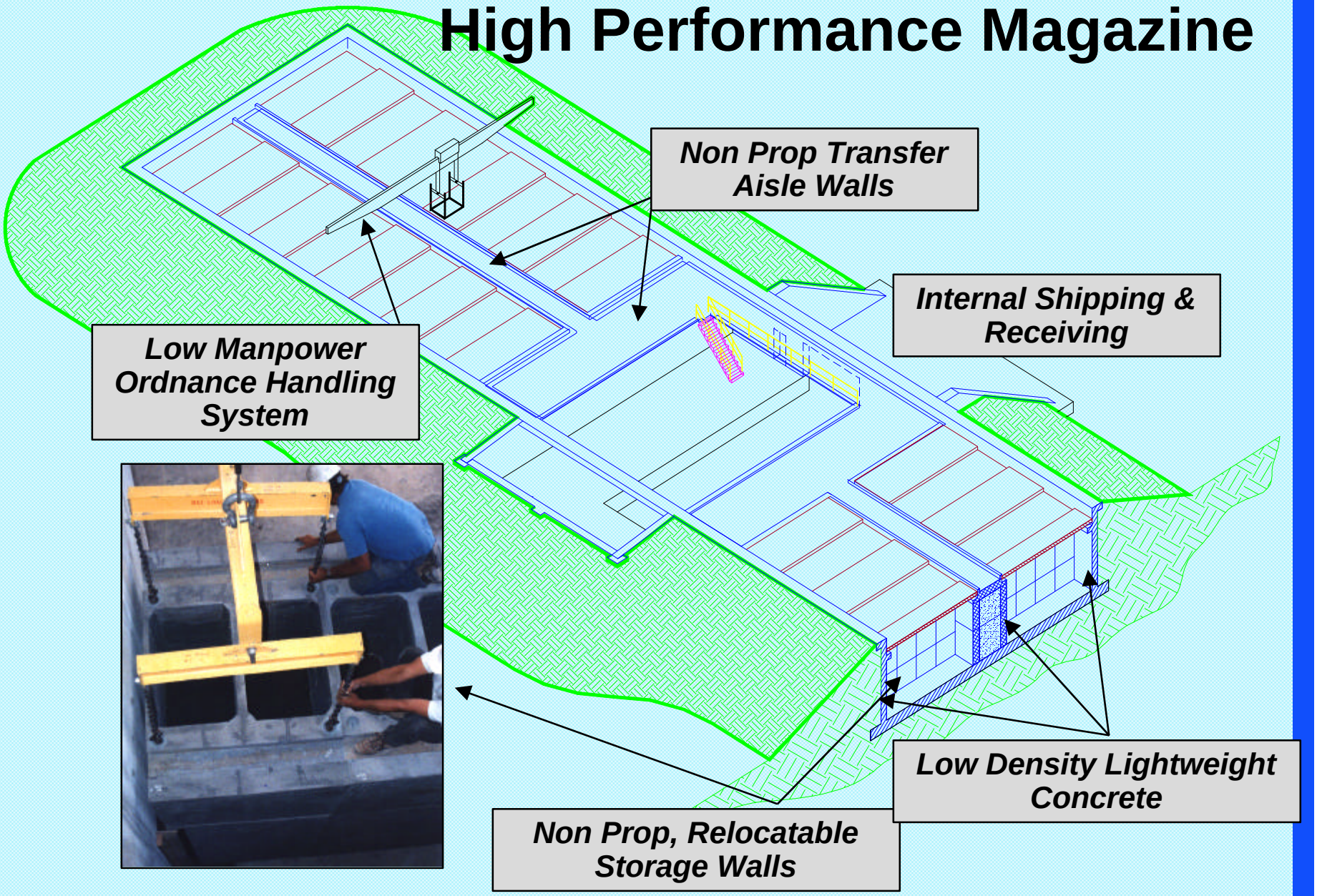
CIAT

Expert Agents Collaboratively Assess Mission Impact & Effectiveness of Facilities & Installations Investments

- **Better Investments**
- **Increased Mission Support**
- **Better Teamwork**
  - **Installation & Ops Communities**

- **Uses NAVFAC Ships Data Base, ALPHA & OTiS**
- **Demo at NAVSTA San Diego**
  - **$4.6M Savings / 5 Yrs (Waterfront Ops Only)**
    - **>> Eliminate 26 Military & 4 Civilian Positions**
- **FY99 Demos at Pearl Harbor and PACNORWEST**

High Performance Magazine



Iwakuni Expansion Project

UNITED STATES MARINE CORPS
MCAS IWAKUNI, JAPAN
PSC S61 Box 1861
FPO AP 96310Ä1861

8000
4ORD
2 Dec 98

From: Ordnance Officer, Marine Corps Air Station Iwakuni, Japan
To: Facility Planners, Marine Corps Air Station Iwakuni, Japan

Subj: NEW ORDNANCE FACILITY/MAGAZINE REQUIREMENTS

Ref:(a) MCAS Iwakuni Runway Relocation Project
(b) Discussion between Mr. Chittenden and CW03 Munday

1. Per ref (b), MCAS Iwakuni Ordnance Division desires to go with proposed siting plan 3.4b, sheet 23b. This is the plan that utilizes all High Performance Magazines (HPM) and gives the most space for a combat loading area.

2. The HPM gives us more flexibility for ammunition storage. The HPM has a square shape and the earth covered magazines have an arch shape internally. The arch shape cuts back our cubic storage capabilities. When we store our ammunition we look at storage as not only square footage but also cubic footage. Ammunition containers are designed to be stored in stacks.

3. The newer weapons that have been introduced into the fleet seem to be taking up more physical storage space. The current magazines here at MCAS Iwakuni were designed years ago when the ammunition was not as sophisticated. The planning of the new Ordnance facility must take into account the size of newer ammunition. Several of our weapons lengths are in access of fourteen feet. The current ammunition inventory we have on hand compared to our stowage space makes it difficult to stow the munitions. With the HPM, we will have the space to safely store our current inventory. If required by new weapon design the HPM will give us the added space to store future weapons.

4. Any questions or comments please contact CWO3 Munday at 253-4207.

L. T. MUNDAY

Provided optional plans for siting of magazines, CALA and ordnance operations facilities

>> Increased Storage Capacity
>> Fewer Magazines
>> Increased Operations Flexibility

Site Plan 4B: Predominately HPMs